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Title:
Dissecting the neural basis for behavioral evolution

Abstract:
Animals display extraordinary variation in their behavior but little is known about how evolution of the nervous system generates this diversity. To gain insight into mechanisms of behavioral evolution, my lab has begun to translate neurogenetic tools from *D. melanogaster* to other *Drosophila* species, allowing us to systematically compare neural circuits and pinpoint sites of adaptive change. In recent work, we compared pheromone-processing pathways in *D. melanogaster* and *D. simulans* to define how these sister species endow the same pheromone, 7,11-HD, with the opposite behavioral valence to underlie mate discrimination. Our results reveal that species-specific pheromone responses can emerge from conservation of the sensory periphery and diversification of central circuitry, and demonstrate how variation at discrete nodes in neural circuits can contribute to behavioral evolution. We are now taking advantage of the rapid evolution of female pheromones in the *Drosophila* genus to examine how parallel changes in mating behaviors have been independently implemented in different species, shedding light on the types of changes that are permissible and preferable within brain circuits.